

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re Application of: Smith

Serial No.10/696,484

Filed: October 29, 2003

Confirmation No.: 6978

For: **TREATED INHERENTLY FLAME RESISTANT POLYESTER FABRICS**

Examiner: Erma C. Cameron

Art Unit: 1762

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Sir:

**AMENDMENT**

This paper is responsive to the Office Action mailed April 3, 2007. Please extend the period for response by one-month up to and including August 3, 2007. Please charge our deposit account \$170 for a one-month extension of time fee (\$120) and one new excess dependent claim fee (\$50) for a large entity. Our firm's deposit account number is 501923.

Please amend the above-referenced application as follows:

**Amendments to the Specification** begin on page 2 of this paper.

**Amendments to the Claims** begin on page 6 of this paper.

**Remarks** begin on page 10 of this paper.

**Amendments to the Specification:**

Please amend the paragraph beginning at page 3, line 1 to read as:

**Summary of the Invention**

The present invention provides [[an]] a textile article having flame resistant properties comprising a plurality of inherently flame resistant fibers formed into a fabric, and a finish on the fabric, wherein the finish imparts a property selected from the group consisting of: an antimicrobial agent, a soil repellent and a fluid repellent flame retardant and antimicrobial properties and a property selected from the group consisting of: a soil repellent and a fluid repellent.

Please replace the text at page 10, line 2 through page 11 Table 7 with the following:

**EXAMPLES [[3]] 5 and 7**

In Example [[3]] 5, a small-scale lab trial was conducted. The AVORA™ inherently flame resistant fabric having the properties in Table 1 was first scoured with an aqueous detergent prior to the application of chemical treatments. After thoroughly rinsing the scoured fabric, it was dried in a hot air oven.

For Example 7 the chemical treatment composition in Table [[6]] 8 was applied to the scoured AVORA™ fabric using a pad applicator. For Example 7, the compositions of Table 10 were used. The pressure of the squeeze rollers was controlled to achieve a wet pick-up of approximately 45% of the chemical treatment composition. The fabric was then dried through exposure to 375 F for 1 minute in a hot air oven. After drying, the finished fabric was tested according to standard published test protocols to assess its flame resistance properties.

The only differences between Examples 5 and 7 were the types of chemical treatments applied. The treatments for each Example are summarized in Tables 8 and 10. The results of the NFPA 701-1996 Edition flame resistance tests are also summarized in Tables 8 and 10.

Table 6:

Chemical Name	General	Treatment	Amount
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ZONYL 7040™	<b>Description</b>		
	Fluorochemical	Fluid/Stain Repellent	30 g/400 mL mix
<b>Characteristic Tested</b>	<b>Test Method</b>	<b>Units</b>	<b>Results</b>
Flammability	NFPA 701—1996 Edition	% Weight Loss & Afterburn Time	Warp—20.9 % Afterflame <2 sec. Passed  Fill—27.3% Afterflame <2 sec. Passed

Several further small-scale lab trials were then conducted. The lab procedures followed were identical to that in Example 3. The only differences between Examples 4–8 were the types of chemical treatments applied. The treatments for each Example in 4–8 are summarized in Tables 7–11. The results of the NFPA 701—1996 Edition flame resistance tests are also summarized in Tables 7–11.

#### EXAMPLE 4

Table 7:

<b>Chemical Name</b>	<b>General Description</b>	<b>Treatment</b>	<b>Amount</b>
AEM 5700™	Organosilane	Antimicrobial	4 g/400 mL mix
<b>Characteristic Tested</b>	<b>Test Method</b>	<b>Units</b>	<b>Results</b>
Flammability	NFPA 701—1996 Edition	% Weight Loss & Afterburn Time	Warp—17.9 % Afterflame <2 sec. Passed  Fill—22.0 % Afterflame <2 sec. Passed

Please change the paragraph starting at page 13, line 8 to read as follows:

While not wishing to be bound by any particular theory, after summarizing the small-scale experiments in the Tables [[7-11]], it was thought that the addition of flame retardant to the chemical treatments does not harm the flame resistant properties of untreated inherently FR

fibers and may, in some cases with heavy chemical loading, assist in kinetically driving the inherent flame retardant to remain chemically bound within the polyethylene terephthalate chain of the polyester fibers. But, it is not a requirement for the present invention to require the addition of flame retardant to the desired chemical treatment in order for the treated fabric to have an equal flame resistance to the untreated inherently FR fibers. Therefore, the present invention, unlike the prior art teachings, has unexpectedly found that the addition of chemical treatments to inherently FR fibers, has substantially equal flame resistance as compared to untreated inherently FR fibers.

Please cancel page 14, line 1 through page 15, line 4

**EXAMPLE 9**

— Another inherently resistant fiber, Trevira CS is similar to AVORA, the two fibers having previously been available as European and American versions of the product from the same manufacturer, which has recently been divided into two separate organizations, each selling its own inherently FR fiber.

— Accordingly, Trevira CS fibers was also tested in a woven fabric having the following construction:

<u>Warp</u>		<u>Filling</u>	
Denier	165	Denier	165
Filaments	64	Filaments	64
X-section	trilobal	X-section	trilobal
Luster	bright	Luster	bright
Textured	no	Textured	no
Fiber	polyester	Fiber	polyester

Without finishing the fabric had these NFPA 701 Burn Test Results:

	% Weight Loss	Afterburn < 2 sec.	An additio nal sample of
Warp	9.3 %	Afterflame < 2 sec. Pass	
Fill	10.9%	Pass	

Trevira CS of the same construction was finished with:

Chemical Name	General Description	Treatment	Amount
ZONYL 7040	Fluorochemical	Fluid/Stain Repellent	30 g/400 mL
AEM 5700	Organosilane	Antimicrobial	4 g/400 mL

The fabric was dried through exposure to 375° F for 1 minute in a hot air oven. The pad pressure was 6 psi and the air flow set at 100%.

The finished fabric was tested with these results:

Characteristic Tested	Test Method	Units	Results
Flammability	NFPA 701-1996 Edition	% Weight Loss & Afterburn Time	Warp - 12.6 % Afterflame < 2 sec. Passed
			Fill - 10.4 % Afterflame < 2 sec. Passed
Fluid Repellency	AATCC Test 22	Spray Rating	400
Presence of Antimicrobial agent	Bromo Blue Internal PFG	Pass/Fail	Pass

**Amendments to the Claims:**

1. – 22. **(Cancelled)**

23.     **(Previously presented)** A method as claimed in claim 42 further comprising testing the fabric and determining that the fabric passes the standard method NFPA 701 – 1996 edition testing protocol.

24.     **(Previously presented)** A method as claimed in claim 42 wherein saturating is accomplished by padding.

25.     **(Withdrawn)** A method as claimed in claim 42 wherein saturating the fabric includes saturating with a composition in which the flame retardant is a phosphonate.

26.     **(Withdrawn)** A method as claimed in claim 42 wherein saturating the fabric includes saturating with a composition in which the flame retardant is a cyclic phosphonate.

27.     **(Withdrawn)** A method as claimed in claim 42 wherein saturating the fabric includes saturating with a composition in which the flame retardant is FLAME RETARDANT 50<sup>TM</sup> cyclic phosphonate flame retardant.

28.     **(Withdrawn)** A method as claimed in claim 42 wherein saturating the fabric includes saturating with a composition in which the flame retardant comprises between about 2

% and 10 % by weight of the composition.

29. **(Withdrawn)** A method as claimed in claim 42 wherein saturating the fabric includes saturating with a composition in which the flame retardant comprises about 4.8 % by weight of the composition.

30. **(Previously presented)** A method as claimed in claim 42 wherein saturating the fabric includes saturating with a composition in which the antimicrobial agent is a molecularly bound antimicrobial agent.

31. **(Previously presented)** A method as claimed in claim 42 wherein saturating the fabric includes saturating with a composition in which the antimicrobial agent is an organosilane.

32. **(Previously presented)** A method as claimed in claim 42 wherein saturating the fabric includes saturating with a composition in which the antimicrobial agent is Octadecylaminodimethyltrihydroxysilylpropyl Ammonium Chloride.

33. **(Previously presented)** A method as claimed in claim 42 wherein saturating the fabric includes saturating with a composition in which the antimicrobial agent comprises between about 0.2 % and 2.0 % by weight of the composition.

34.     (**Previously presented**) A method as claimed in claim 42 wherein saturating the fabric includes saturating with a composition in which the antimicrobial agent comprises about 0.48 % by weight of the composition.

35.     (**Withdrawn**) A method as claimed in claim 42 wherein saturating the fabric includes saturating with a composition in which the fluid repellent is also a soil repellant.

36.     (**Withdrawn**) A method as claimed in claim 42 wherein saturating the fabric includes saturating with a composition in which the fluid repellent is a fluorochemical.

37.     (**Withdrawn**) A method as claimed in claim 42 wherein saturating the fabric includes saturating with a composition in which the fluid repellent is a water based dispersion of fluorinated acrylic co-polymer.

38.     (**Withdrawn**) A method as claimed in claim 42 wherein saturating the fabric includes saturating with a composition in which the fluid repellent comprises between about 2 % and 10 % by weight of the composition.

39.     (**Withdrawn**) A method as claimed in claim 42 wherein saturating the fabric includes saturating with a composition in which the fluid repellent comprises about 3.6 % by weight of the composition.

40.     (**Previously presented**) A method as claimed in claim 42 wherein forming includes fabric formation from TREVIRA CS<sup>TM</sup> fibers of polyester incorporating organic phosphorous compounds.

41.     (**Withdrawn**) A method as claimed in claim 42 wherein forming includes fabric formation from AVORA<sup>TM</sup> polyester fibers incorporating organic phosphorous compounds

42.     (**Currently Amended**) A method of finishing an inherently flame resistant fabric comprising:

forming a fabric of inherently flame resistant polyester fibers,  
saturating the fabric with a composition containing a flame retardant and an antimicrobial agent and one or more of an antimicrobial agent, a fluid repellent agent and a soil repellent agent, and  
drying the fabric.

43.     (**New**) A method as claimed in claim 42 further comprising the step of making the fabric into a product selected from the group consisting of a bedspread, tablecloth, bedding, drapery, or furniture upholstery.

## REMARKS

The Office Action reflects careful consideration of the application by the Examiner, and same is appreciated. The Office Action will be responded to by reference to the numbered items starting in the detailed action on page 2 of the Office Action

In item 2 of the Office Action, the Examiner said that applicant was at one point saying that the addition of a flame retardant is necessary, and at other times not. She pointed out where there were still indications that the FR agent is optional. Applicant has amended the specification to remove or revise the passages pointed out by the examiner.

In items 11, 12, 14, and 15 the Examiner rejects the claims as being anticipated by or obvious from the disclosures of JP 07-157977 or EP 503114. It is believed that the amendment to claim 42 to recite the addition of the antimicrobial as part of the composition with which the fabric is saturated overcomes these rejections. Neither the Japanese nor the European reference includes an antimicrobial agent as a finishing agent, so the claims patentably distinguish over the references.

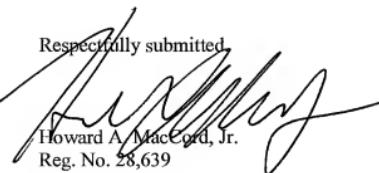
It is acknowledged that in paragraphs 16-19, the examiner rejected claims that include the use of the antimicrobial agent as obvious from JP 07-157977 or EP 503114 in view of White et al (A Comparison of Antimicrobials for the Textile Industry, 2000) or U.S. Patent 4,842,766 to Blehm et al. These rejections are believed to be in error. While the White and Blehm references teach the use of antimicrobials on fabrics, they do not mention use on inherently FR polyester, as claimed. As applicant has pointed out numerous times, the makers of inherently FR polyester fibers specifically teach NOT to apply various finishes, in order to avoid loss of FR properties. See applicant's specification at page 2, line 9-16. Thus, those working in the field of inherently

FR polyester fabrics treat them differently than ordinary polyester. What may have been obvious for conventional polyester was not obvious for inherently FR polyester. Accordingly, it is believed that the claims, which now recite “saturating the fabric with a composition containing a flame retardant and an antimicrobial agent and one or more of a fluid repellent agent and a soil repellent agent” distinguish over the prior art.

Furthermore, new claim 43 recites the steps of making the fabric into a product selected from the group consisting of a bedspread, bedding, drapery, or furniture upholstery. This claim is supported by the specification at page 1, line 28-page 2, line 4. The fabrics of JP 07-157977 or EP 503114 are awning fabrics. Those of ordinary skill would not consider use of the awning fabrics for bedspread, tablecloth, bedding, drapery, or furniture upholstery. The prior art fabrics are thick and bulky, unsuited to the end uses of claim 43. The Japanese reference, in particular, uses a thick coating (at least 20g/m<sup>2</sup> -see paragraph 16) of resin so the awning will be both water repellent and water resistant. It would not be suited for cutting and sewing into the items of claim 43.

It is believed that this application is now in condition for allowance. This should include withdrawn claims 25-29, 35-29, and 41, since they are dependent on allowable claim 42. Again, if the Examiner has any remaining concerns, she is encouraged to telephone the undersigned for expeditious handling.

Respectfully submitted,



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